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EXAMINER

WINTER, JOHN M

ART UNIT

PAPER NUMBER

3621

DATE MAILED: 09/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

SW

# Office Action Summary

Application No.

09/719,399

Applicant(s)

COLLBERG ET AL.

Examiner

John M Winter

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 09 February 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) 29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6-21, 23-28 and 30-40 is/are rejected.
- 7) ☒ Claim(s) 4, 5 and 22 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

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### DETAILED ACTION

Claims 1-40 have been examined.

Claim 29 has been canceled.

#### *Claim Rejections - 35 USC §101*

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 24 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Descriptive material that cannot exhibit any functional interrelationship with the way in which computing processes are performed does not constitute a statutory process, machine, manufacture or composition of matter and should be rejected under 35 U.S.C. 101. Thus, Office personnel should consider the claimed invention as a whole to determine whether the necessary functional interrelationship is provided. In claim 24 the necessary functional interrelationship is not present, the claimed invention is merely a watermark.

Claims 25 and 26 are dependant on rejected claim 35, and is rejected for at least the same reasons.

#### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 20 states "the number is derived from a combination of numbers depending on a context and application for the watermark", the claimed feature is has no limitation since it can employ any number under any context.

#### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claims 1-3 and 6-19,21,23 27,28 and 30-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moskowitz et al. (US Patent No 5,745,569)

As per claim 1,  
Moskowitz et al. ('569) discloses a method of watermarking a software object comprising the steps of

a watermark is stored in the state of the software object. (Column 5, lines 40-51)

Official Notice is taken that "providing an input sequence" is common and well known in prior art in reference to computer programs. It would have been obvious to one having ordinary skill in the art at the time the invention was made that the program would be run with an input sequence because this is necessary for a program to function. The Examiner notes that it is common to all software

As per claim 2,

Moskowitz et al. ('569) discloses the method as claimed in claim 1  
wherein the software object is a program or a piece of a program. (Title)

As per claim 3,

Moskowitz et al. ('569) discloses the method as claimed in claim 1,

Official Notice is taken that "the state of the software object corresponds to the current values held in a stack, a heap, and global variables of the software object" is common and well known in prior art in reference to computer programs. It would have been obvious to one having ordinary skill in the art at the time the invention was made that the state of the software object may correspond to the current values held in the stack, heap, global variables, registers, program counter of the software because this is necessary for a program to function. The Examiner notes that it is common to all software.

As per claim 6,

Moskowitz et al. ('569) discloses the method of claim 1,

Official Notice is taken that "the watermark is embedded in a topology of a dynamically built graph structure" is common and well known in prior art in reference to computer programs. It would have been obvious to one having ordinary skill in the art at the time the invention was made that the watermark is embedded in the topology of a dynamically built graph structure because this is a fundamental representation of a watermark. The Examiner notes that it is common to steganographic techniques.

As per claim 7,

Moskowitz et al. ('569) discloses the method as claimed in claim 6,

Official Notice is taken that "the dynamically built graph structure corresponds to a representation of a data structure of the program and may be viewed as a set of nodes together with a set of vertices" is common and well known in prior art in reference to computer programs. It would have been obvious to one having ordinary skill in the art at the time the invention was made that the graph structure corresponds to a representation of the data structure of the program

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and may be viewed as a set of nodes together with a set of vertices because this is a fundamental representation of a program. The Examiner notes that it is common to all software.

As per claim 8,  
Moskowitz et al. ('569) discloses the method of claim 1,  
further comprising the step of building a recognizer concurrently with the input sequence  
and the watermark. (Column 6, lines 9-32)

As per claim 9,  
Moskowitz et al. ('569) discloses the method of claim 8  
wherein the recognizer is a function adapted to identify and extract the watermark from all other  
dynamic structures on a heap or stack.(Column 6, lines 9-32)

The Examiner notes that as written the term "all other dynamic structures on a heap or  
stack" comprises the entire program, as it is being run, even if data is read from a hard drive  
(such as a registration key) it will be stored in an allocated memory position in the heap or the  
stack.

As per claim 10,  
Moskowitz et al. ('569) discloses the method of claim 8  
wherein the watermark incorporates a marker that will allow the recognizer to recognize  
it easily.(Column 6, lines 38-56)

As per claim 11,  
Moskowitz et al. ('569) discloses the method of claim 8  
Official Notice is taken that "the recognizer is retained separately from the program and  
whereby the recognizer inspects the state of the program" is common and well known in prior art  
in reference to digital security. It would have been obvious to one having ordinary skill in the art  
at the time the invention was made that the recognizer is retained separately from the program  
and whereby the recognizer inspects the state of the program in order to increase the security of  
the method by separating components of the verification system to make it more difficult to  
compromise the system. The Examiner notes that it is common for registration programs to exist  
independently from the programs they register.

As per claim 12,  
Moskowitz et al. ('569) discloses the method of claim 8  
Official Notice is taken that "wherein the recognizer is dynamically linked with the  
program when it is checked for the existence of a watermark" is common and well known in  
prior art in reference to operating systems. It would have been obvious to one having ordinary  
skill in the art at the time the invention was made that the recognizer is dynamically linked with  
the program when it is checked for the existence of a watermark in order to utilize memory more  
efficiently. The Examiner notes that it is common in many operating systems to dynamically  
link and unlink modules (libraries, drivers etc..) from the OS kernel to conserve the amount of  
memory used by the kernel.

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As per claim 13,

Moskowitz et al. ('569) discloses the method of claim 1

Official Notice is taken that "the software object is a part of an application that is obfuscated or incorporates tamper-proofing code" is common and well known in prior art in reference to operating systems. It would have been obvious to one having ordinary skill in the art at the time the invention was made that the application of which the object forms a part is obfuscated or incorporates tamper-proofing code in order to make the code executable. The Examiner notes that obfuscation (i.e. made difficult to read) is common when code is compiled into an executable form.

As per claim 14,

Moskowitz et al. ('569) discloses the method of claim 8,

wherein the recognizer checks the watermark for a signature property. (Column 6, lines 38-56)

As per claim 15,

Moskowitz et al. ('569) discloses the method of claim 14

Official Notice is taken that "the signature property is evaluated by testing for a specific result from a hard computational problem." is common and well known in prior art in reference to digital security. It would have been obvious to one having ordinary skill in the art at the time the invention was made that the signature property is evaluated by testing for a specific result from a hard computational problem in order to make signature non trivial to crack. The Examiner notes that this feature is common to public key encryption (i.e. RSA).

As per claim 16,

Moskowitz et al. ('569) discloses the method of claim 14

including the step of creating a number having at least one numeric property which is embedded in the topology of the watermark whereby the signature property is evaluated by testing the at least one or more numeric property.(Column 6, lines 38-56)

As per claim 17

Moskowitz et al. ('569) discloses the method of claim 16

Official Notice is taken that "the signature property is evaluated by testing whether the number is a product of two primes" is common and well known in prior art in reference to digital security. It would have been obvious to one having ordinary skill in the art at the time the invention was made that the signature property is evaluated by testing whether n is the product of two primes order to make signature non trivial to crack. The Examiner notes that this feature is common to public key encryption (i.e. RSA).

As per claim 18

Moskowitz et al. ('569) discloses a method of verifying the integrity or origin of a program including the steps of:

watermarking the program with a watermark, wherein the watermark is stored in the state of a program as the program is being run (Column 5, lines 40-51)

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Official Notice is taken that "being run with a input sequence" is common and well known in prior art in reference to computer programs. It would have been obvious to one having ordinary skill in the art at the time the invention was made that the program would be run in a sequence because this is necessary for a program to function. The Examiner notes that it is common to all software

building a recognizer concurrently with the input and watermark wherein the recognizer is adapted to extract the watermark from other dynamically allocated data wherein the recognizer is adapted to check for a number  $n$ . (Column 6, lines 38-56)

Official Notice is taken that "the recognizer is retained separately from the program and whereby the recognizer inspects the state of the program" is common and well known in prior art in reference to digital security. It would have been obvious to one having ordinary skill in the art at the time the invention was made that  $R$  is retained separately from the program and whereby  $R$  inspects the state of the program in order to increase the security of the method by separating components of the verification system to make it more difficult to compromise the system. The Examiner notes that it is common for registration programs to exist independently from the programs they register.

As per claim 19

Moskowitz et al. ('569) discloses the method of claim 18

Official Notice is taken that "the number is the product of two primes and wherein the number is embedded in the topology of the watermark" is common and well known in prior art in reference to digital security. It would have been obvious to one having ordinary skill in the art at the time the invention was made that  $n$  is the product of two primes and wherein  $n$  is embedded in the topology of  $W$  in order to make signature non trivial to crack. The Examiner notes that this feature is common to public key encryption (i.e. RSA).

As per claim 21,

Moskowitz et al. ('569) discloses the method of claim 18

Official Notice is taken that "adapted to be resistant to tampering, the resistance to tampering capable of being by means of obfuscation or by adding tamper-proofing code" is common and well known in prior art in reference to operating systems. It would have been obvious to one having ordinary skill in the art at the time the invention was made that the application of which the object forms a part is obfuscated or incorporates tamper-proofing code in order to make the code executable. The Examiner notes that obfuscation (i.e. made difficult to read) is common when code is compiled into an executable form.

As per claim 23,

Moskowitz et al. ('569) A method of watermarking software.

Official Notice is taken that "embedding a watermark in a static string; and applying an obfuscation technique whereby this static string is converted into executable code" is common and well known in prior art in reference to operating systems. It would have been obvious to one having ordinary skill in the art at the time the invention was made to embed a watermark in a static string; and apply an obfuscation technique whereby this static string is converted into

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executable code in order to make the code executable. The Examiner notes that obfuscation (i.e. made difficult to read) is common when code is compiled into an executable form.

As per claim 27

Moskowitz et al. ('569) discloses a method of fingerprinting software comprising the steps of:

providing a plurality of watermarked programs, the plurality of watermarked programs being obtained by providing an input sequence for each program of the plurality of programs and storing a watermark in a state of a software object for the program. (Column 5, lines 40-51)

Official Notice is taken that "being run with a input sequence" is common and well known in prior art in reference to computer programs. It would have been obvious to one having ordinary skill in the art at the time the invention was made that the program would be run in a sequence because this is necessary for a program to function. The Examiner notes that it is common to all software

As per claim 28

Moskowitz et al. ('569) discloses the method of fingerprinting software as claimed in claim 27. .

Official Notice is taken that "the plurality of watermarked programs each of which has a number with a common prime factor" is common and well known in prior art in reference to digital security. It would have been obvious to one having ordinary skill in the art at the time the invention was made that the plurality of watermarked programs each of which has a number with a common prime factor in order to make signature non trivial to crack. The Examiner notes that this feature is common to public key encryption (i.e. RSA).

As per claim 30,

Moskowitz et al. ('569) discloses a computer readable medium including a program for watermarking a software object, the program including instructions for:

storing a watermark in the state of the software object as the software object is being run with the input sequence. (Column 5, lines 40-51)

Official Notice is taken that "providing an input sequence" is common and well known in prior art in reference to computer programs. It would have been obvious to one having ordinary skill in the art at the time the invention was made that the program would be run with an input sequence because this is necessary for a program to function. The Examiner notes that it is common to all software

As per claim 31,

Moskowitz et al. ('569) discloses a computer comprising:  
a software object, an input sequence; a watermark stored in the state of the software object as the software object is being run with the input sequence. (Column 5, lines 40-51)

As per claim 32,



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Moskowitz et al. ('569) discloses a method of fingerprinting software comprising the steps of:

providing a plurality of watermarked programs, the plurality of watermarked programs being obtained by watermarking each program of the plurality of programs with a watermark,(Abstract)

wherein the watermark is stored in the state of a program as the program is being run with an input sequence(Column 5, lines 40-51)

building a recognizer concurrently with the input sequence and watermark W wherein the recognizer is adapted to extract the watermark from other dynamically allocated data (Column 6, lines 9-32)

Official Notice is taken that "the recognizer is retained separately from the program and whereby the recognizer inspects the state of the program" is common and well known in prior art in reference to digital security. It would have been obvious to one having ordinary skill in the art at the time the invention was made that R is retained separately from the program and whereby R inspects the state of the program in order to increase the security of the method by separating components of the verification system to make it more difficult to compromise the system. The Examiner notes that it is common for registration programs to exist independently from the programs they register.

As per claim 33

Moskowitz et al. ('569) discloses a method of fingerprinting software comprising the steps of

providing a plurality of watermarked programs, the plurality of watermarked programs being obtained by watermarking each program of the plurality of programs with a watermark,(Abstract)

Official Notice is taken that " the watermark being obtained by embedding a watermark in a static string and applying an obfuscation technique whereby the static string is converted into executable code" is common and well known in prior art in reference to operating systems. It would have been obvious to one having ordinary skill in the art at the time the invention was made that the application of which the object forms a part is obfuscated or incorporates tamper-proofing code in order to make the code secure. The Examiner notes that obfuscation (i.e. made difficult to read) is common when code is compiled into an executable form.

As per claim 34

Moskowitz et al. ('569) discloses a method of fingerprinting software comprising the steps of

providing a plurality of watermarked programs, the plurality of watermarked programs being obtained by watermarking each program of the plurality of programs with a watermark,(Abstract)

Official Notice is taken that "the watermark being obtained by choosing a watermark from a class of graphs having a plurality of members, each member of the class of graphs has at least one property, the at least one property being capable of being tested by integrity-testing software and applying the watermark to the software" is common and well known in prior art in reference to computer programs. It would have been obvious to one having ordinary skill in the

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art at the time the invention was made that the watermark is chosen from a class of graphs because this is a fundamental representation of a watermark. The Examiner notes that it is common to steganographic techniques.

As per claim 35

Moskowitz et al. ('569) discloses a computer-readable medium including a program for verifying the integrity or origin of a program, the program including instructions for:

watermarking the program with a watermark, wherein the watermark is stored in the state of a program as the program is being run with an input sequence;(Column 5, lines 40-51)

building a recognizer concurrently with the input sequence and watermark wherein the recognizer is adapted to extract the watermark from other dynamically allocated data (Column 6, lines 9-32)

Official Notice is taken that "the recognizer is retained separately from the program and whereby the recognizer inspects the state of the program" is common and well known in prior art in reference to digital security. It would have been obvious to one having ordinary skill in the art at the time the invention was made that R is retained separately from the program and whereby R inspects the state of the program in order to increase the security of the method by separating components of the verification system to make it more difficult to compromise the system. The Examiner notes that it is common for registration programs to exist independently from the programs they register.

As per claim 36

Moskowitz et al. ('569) discloses a computer-readable medium including a program for watermarking software, the program including instructions for:

embedding a watermark in a static string;(Abstract)

Official Notice is taken that "applying an obfuscation technique whereby the static string is converted into executable code" is common and well known in prior art in reference to operating systems. It would have been obvious to one having ordinary skill in the art at the time the invention was made that the application of which the object forms a part is obfuscated or incorporates tamper-proofing code in order to make the code secure. The Examiner notes that obfuscation (i.e. made difficult to read) is common when code is compiled into an executable form.

As per claim 37

Moskowitz et al. ('569) discloses a computer-readable medium including a program for watermarking software, the program including instructions for:

applying the watermark to the software,(Abstract)

Official Notice is taken that "the watermark being obtained by choosing a watermark from a class of graphs having a plurality of members, each member of the class of graphs has at least one property, the at least one property being capable of being tested by integrity-testing software" is common and well known in prior art in reference to computer programs. It would have been obvious to one having ordinary skill in the art at the time the invention was made that the watermark is chosen from a class of graphs because this is a fundamental representation of a watermark. The Examiner notes that it is common to steganographic techniques.

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As per claim 38

Moskowitz et al. ('569) discloses a computer capable of verifying the integrity or origin of a program, the computer comprising:

an input sequence; a watermark for watermarking the program, wherein the watermark is stored in the state of a program as the program is being run with the input sequence;(Column 5, lines 40-51)

a recognizer built concurrently with the input sequence and watermark wherein the recognizer is adapted to extract the watermark from other dynamically allocated data (Column 6, lines 9-32).

Official Notice is taken that "the recognizer is retained separately from the program and whereby the recognizer is adapted to check for a number" is common and well known in prior art in reference to digital security. It would have been obvious to one having ordinary skill in the art at the time the invention was made that R is retained separately from the program and whereby R inspects the state of the program in order to increase the security of the method by separating components of the verification system to make it more difficult to compromise the system. The Examiner notes that it is common for registration programs to exist independently from the programs they register.

As per claim 39

Moskowitz et al. ('569) discloses a computer for watermarking software comprising:

a static string; a watermark embedded in the static string;(Abstract)

Official Notice is taken that "an obfuscation technique whereby the static string is converted into executable code" is common and well known in prior art in reference to operating systems. It would have been obvious to one having ordinary skill in the art at the time the invention was made that the application of which the object forms a part is obfuscated or incorporates tamper-proofing code in order to make the code secure. The Examiner notes that obfuscation (i.e. made difficult to read) is common when code is compiled into an executable form.

As per claim 40

Moskowitz et al. ('569) discloses a computer comprising:

software to which the watermark is applied.(Abstract)

Official Notice is taken that "the watermark being obtained by choosing a watermark from a class of graphs having a plurality of members, each member of the class of graphs has at least one property, the at least one property being capable of being tested by integrity-testing software" is common and well known in prior art in reference to computer programs. It would have been obvious to one having ordinary skill in the art at the time the invention was made that the watermark is chosen from a class of graphs because this is a fundamental representation of a watermark. The Examiner notes that it is common to steganographic techniques.

*Allowable Subject Matter*

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Claims 4, 5 and 22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims and complying with double patenting statutes.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### *Conclusion*

Examiners note: Examiner has cited particular columns and line numbers in the references as applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to the specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant in preparing responses, to fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the examiner.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John M Winter whose telephone number is (703) 305-3971. The examiner can normally be reached on M-F 8:30-6, 1st Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James P Trammell can be reached on (703)305-9768. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-7687 for regular communications and (703) 305-7687 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1113.

JMW

September 8, 2003



JAMES P. TRAMMELL  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 3600